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Most bacteria beneficial to man, UM microbiologist says

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MOST BACTERIA
BENEFICIAL TO MAN,
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By Karen Gookin
UM Information Services

MISSOULA--

Bacteria, considered by many laymen to be life-long enemies, are in most cases beneficial to mankind, according to Dr. Walter L. Koostra, an assistant professor of microbiology at the University of Montana.

Dr. Koostra said only "a minority of bacteria" cause diseases, so a human being can be too clean or overly protected from the organisms.

"Bacteria, and microbes in general, have always been with us," Dr. Koostra said. "Wine, beer, cottage cheese and pickles are only a few of the foods we eat which contain bacteria, not to mention the bacteria which undergo entire life processes within our bodies."

Many bacteria are beneficial in producing immunity to disease, Dr. Koostra continued. If these bacteria are absent, the immunity may not be obtained.

For example, in experiments with gnoto biotic or "germ-free" animals which are taken from their mother in a completely sterile caeserian-section birth, and then kept in a sterile situation throughout their lives, there is a "vastly increased susceptibility to infection," Dr. Koostra said.

Experiments with such "germ-free" animals have taken place at Notre Dame University, South Bend, Ind., and also at Montana State University in Bozeman.

Lower animals, as well as human beings, contact bacteria naturally and continuously from the mement of their birth. Immunity could be built up gradually through years of contact with various bacteria, or there could be cross-immunity to certain diseases through a combination of different bacteria, Dr. Koostra said.

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The "germ-free" animals, which have had little contact with any bacterium, acquire no such immunity, Dr. Koostra said. They are physically smaller than animals which have lived in a natural, bacteria-ridden environment. Any contact with the pneumonia-causing bacterium, for example, would definitely kill a "germ-free" animal, said Dr. Koostra.

Bacteria are striving to multiply, just like human beings, said Dr. Koostra, in the struggle for the survival of the fittest. Human beings often become a bacterium's host, and more often than not it is a mutual give and take relationship.

However, he continued, a human being's "overuse of antibiotics may lead to a reduction in the body's normal bacteria content." The normal bacteria could then become replaced by abnormal or disease-causing bacteria, he said.

"Physicians are using greater caution against the overuse of antibiotics," Dr. Koostra said. For example, penicillin can have no effect against colds. If it is used under this condition, its normal effectiveness against other diseases may be reduced, said Dr. Koostra.

"The best adapted bacteria cause only minor diseases, if any," Dr. Koostra said. Any "population explosion" among a specific type of bacterium could be related to our own ecological situation here on earth.

"It would be harmful for bacteria to kill off the host," Dr. Koostra said, "because then the bacteria would die, too.

"Europeans definitely believe that we Americans are obsessed with cleanliness," Dr. Koostra said.

"An extreme example of the opposite is the case of former Premier Nikita Khrushchev's father, who was said to have had two baths--one after his birth, and one after his death," said Dr. Koostra. "At the other extreme, however, there are those who bathe three or four times daily.

"Bacteria act in many beneficial ways, aside from providing immunity to various diseases," Dr. Koostra said. "For example, on the outer surface of our bodies, bacteria help to slough off dead epidermus or skin. This action is what produces body odor.

"The bacterial flora of the intestine benefits humans in a much more profound way, with no disadvantages," said Dr. Koostra. The predominant bacterium in the intestine is Escherichia coli, commonly called E. coli by microbiologists.

"The E. coli most notably produces vitamin K, which stimulates the clotting ability of blood. Without this vitamin, which is rarely obtainable through foods, the blood may not clot and a person could bleed abnormally from even a minor cut.

"When we speak of bacteria in the body, the mouth, or on the skin," said Dr. Koostra, "we must speak in terms of billions or trillions, or even greater numbers."

The soaps and mouthwashes that claim to kill bacteria on contact by the hundreds, thousands or millions may do exactly that, but they aren't even getting the job half done, he said.

"Besides," Dr. Koostra continued, "many bacteria recover within 20 minutes and can reproduce and double within that time. So within an hour or less you're back where you started.

"The effects of certain soaps and mouthwashes are probably more psychological than anything else," Dr. Koostra said, "and at any rate, there should be no offense in honest sweat."

Born in Berea, Ky., in 1934, Dr. Koostra received his bachelor's degree in chemistry, his master's degree in biochemistry, and his doctor of philosophy degree in microbiology from the University of South Dakota, Vermillion.

Dr. Koostra has been at the University of Montana since 1968 and he teaches courses in microbial chemistry and physiology, and immunology. He is continuing research here in the fields of medical technology and physiology--the life processes of bacteria.

Dr. Koostra is a member of Pi Alpha Scientific honorary and Sigma Xi scientific reserach honorary which presented him with the Sigma Xi award for original reserach at the University of South Dakota in 1967.

He is also a member of the American Association for the Advancement of Science, the American Chemical Society, the American Society for Microbiology and the Montana Academy of Science.

Dr. Koostra lives at 908 Stephens Avenue in Missoula. He and his wife, the former Joyce Reynolds of Surgoinsville, Tenn., have four children, Barbara, 13, Robert, 12, Karen, 10, and Benjamin, 2.

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